

Visual Schema for JSON files submitted to the SEP Scoreboard

NOTE: naming convention for files submitted:

ModelShortName.PredictionWindowStartTime.IssueTime.json

JSON key	Type	Boundaries	Description	Corresponding command line argument for helper script
sep_forecast_submission		required		
model		required	Model information	
short_name	string	required	Short name (e.g. acronym) of model to appear on scoreboard. Consider including version number with acronym if distinction needed, 16 character limit.	model-short-name
spase_id	string	required	Link to URL of full model description metadata in CCMC metadata registry in SPASE format (contact CCMC to register your model).	spase-id
issue_time	datetime*	required	Forecast issue time (e.g. model run is complete and forecast is created)	issue-time
mode	string	required	allowed values: forecast, historical, nowcast, simulated_realtime_forecast, simulated_realtime_nowcast	mode
triggers		optional	Provide if forecast is issued based on a trigger. This can be expanded. Contact CCMC to add your trigger if it is missing.	
cme		> 1 allowed, optional		
start_time	datetime*	required, if cme used	Timestamp of 1st coronagraph image CME is visible in	cme-start-time
ltoff_time	datetime*	optional	Timestamp of coronagraph image with 1st indication of CME lloff (used by CACTUS)	cme-ltoff-time
lat	float	optional	CME latitude (deg)	cme-lat
lon	float	optional	CME longitude (deg)	cme-lon
pa	float	optional	CME plane-of-sky position angle (measured from solar north in degrees counter-clockwise)	cme-pa
half_width	float	optional	CME half-width (deg)	cme-half-width
speed	float	optional	CME speed (km/s)	cme-speed
acceleration	float	optional	CME acceleration (km/s ²)	cme-acceleration
height	float	optional	CME height at which the above parameters were derived (solar radii from Sun center)	cme-height
time_at_height	datetime*	optional	CME time at specified height	
time	datetime*	required, if time_at_height used		cme-time-at-height-time
height	float	required, if time_at_height used		cme-time-at-height-height
coordinates	string	required, if lat or lon used	In solar radii	cme-coordinates
catalog	string	optional	Coordinate system for CME lat/lon parameters (e.g. HEEQ or Carrington)	
catalog_id	string	required if catalog=DONKI, otherwise optional	Name of catalog where CME information was pulled from. allowed values: ARTEMIS, DONKI, HELCATS, JHU APL, CACTUS_NRL, CACTUS_SIDC, CORIMP, SEEDS, SOHO_CDAW_STEREO_COR1, SWPC, MISO_KCOR (contact us to add a new catalog name)	cme-catalog-id
urls	string	> 1 allowed, optional	List of urls where CME information can be found, or information was pulled from	cme-urls
flare		> 1 allowed, optional		
last_data_time	datetime*	required, if flare used	Last time data timestamp that was used to create forecast (relevant for forecasts issued before flare end times)	flare-last-data-time
start_time	datetime*	optional	Flare start time	flare-start-time
peak_time	datetime*	optional	Flare peak time	flare-peak-time
end_time	datetime*	optional	Flare end time	flare-end-time
location	string	optional	Flare location in Stonyhurst coordinates. NDDW00/S00E00 format	flare-location
intensity	float	optional	Flare intensity (W/m ²)	flare-intensity
integrated_intensity	float	optional	Flare integrated intensity (J/m ²)	flare-integrated-intensity
noaa_region	integer	optional	Associated NOAA active region number (including the preceding 1)	flare-noaa-region
peak_ratio	float	optional	The peak ratio of the long and short GOES X-ray channels	
urls	string	> 1 allowed, optional	List of urls where flare information can be found, or information was pulled from	flare-urls
cme_simulation		> 1 allowed, optional		
model	string	required, if cme_simulation used	Model name	cme-sim-model
simulation_completion_time	datetime*	optional	Simulation completion time	cme-sim-completion-time
urls	string	> 1 allowed, optional	List of urls where simulation information can be found, or information was pulled from	cme-sim-urls
particle_intensity		> 1 allowed, optional		
observatory	string	required, if particle_intensity used	Name of observatory/spacecraft data are from	pi-observatory
instrument	string	required, if particle_intensity used	Name of instrument data are from	pi-instrument
last_data_time	datetime*	required, if particle_intensity used	Last time data timestamp used to create forecast	pi-last-data-time
ongoing_events		> 1 allowed, optional	If an ongoing event triggers your forecast, list the properties you used	
start_time	datetime*	required, if ongoing_events used	start time	pi-ongoing-events-start-time
threshold	float	required, if ongoing_events used	threshold used to define the event in pfu	pi-ongoing-events-threshold
energy_min	float	required, if ongoing_events used	min of energy channel range in MeV	pi-ongoing-events-energy-min
energy_max	float	required, if ongoing_events used	max of energy channel range in MeV. -1 represented an unbounded integral channel	pi-ongoing-events-energy-max
inputs		> 1 allowed, optional		
magnetic_connectivity		> 1 allowed, optional	Provide if key model inputs are not represented in the triggers field. Provide if specific magnetic connectivity information was used to produce your forecast.	
method	string	required, if magnetic_connectivity used	allowed values: Parker Spiral, PFSS-Parker Spiral, WSA, WSA-ENLIL, ADAPT-WSA-ENLIL (contact us to add your method to this format)	magcon-method
lat	float	optional	latitude (deg) position of magnetic field line footprint linking the observing spacecraft to the Sun (in Stonyhurst coordinates).	magcon-lat
lon	float	required, if magnetic_connectivity used	longitude (deg) position of magnetic field line footprint linking the observing spacecraft to the Sun (in Stonyhurst coordinates).	magcon-lon
connection_angle		optional	angle between the related solar event and the foot point of the magnetic field line linking the observing spacecraft to the Sun.	
great_circle	float	optional	great circle distance between the solar event and the magnetic connectivity footprint (deg)	magcon-angle-great-circle
lat	float	optional	connection angle lat = solar event lat - magnetic connectivity footprint lat (deg)	magcon-angle-lat
lon	float	required, if connection_angle used	connection angle lon = solar event lon - magnetic connectivity footprint lon (deg)	magcon-angle-lon
solar_wind		optional	Use if a certain solar wind speed was assumed to compute the magnetic connectivity	
observatory	string	optional	Name of observatory/spacecraft data are from	magcon-solar-wind-observatory
speed	float	required, if solar_wind used	Assumed solar wind speed to compute magnetic connectivity	magcon-solar-wind-speed
magnetogram		> 1 allowed, optional		
observatory	string	required, if magnetogram used	Name of observatory/spacecraft data are from	magnetogram-observatory
instrument	string	required, if magnetogram used	Name of instrument data are from	magnetogram-instrument
products		optional		
product	string	> 1 allowed, optional	Name of data product used	magnetogram-product
last_data_time	datetime*	required, if products used, > 1 allowed	Last time data timestamp available at the time of forecast	magnetogram-product-last-data-time
coronagraph		> 1 allowed, optional		
observatory	string	required, if coronagraph used	Name of observatory/spacecraft data are from	
instrument	string	required, if coronagraph used	Name of instrument data are from	
products		optional		
product	string	> 1 allowed, required, if products used	Name of data product used	
last_data_time	datetime*	> 1 allowed, required, if products used	Last time data timestamp available at the time of forecast	
forecasts		> 1 allowed, at least 1 required	>1 allowed such that forecasts for multiple energy channels can be submitted in one file (if they have the same issue time)	

	energy_channel		required	Each forecast is defined by the energy channel specified	
	min	float	required	min of energy channel range	energy-min
	max	float	required	max of energy channel range. -1 represented an unbounded integral channel	energy-max
	units	string**	required	energy channel units	energy-units
	species	string	required	allowed values: electron, proton, helium, helium3, helium4, oxygen, iron, ion	species
	location	string	required	allowed values: mercury, venus, earth, mars, psp, stereo0, stereo1, dawn, juno, L1, L2, L4, L5	location
	prediction_window		required	all forecast values provided are relevant only in this prediction window	prediction-window
	start_time	datetime*	required	start of forecast prediction window	(first value given for 'prediction-window')
	end_time	datetime*	required	end of forecast prediction window	(second value given for 'prediction-window')
	peak_intensity		optional		
	intensity	float	required, if peak_intensity used	forecast peak intensity at onset value	peak-intensity
	units	string**	required, if peak_intensity used	forecast peak intensity at onset value units	peak-intensity-units
	uncertainty	float	optional	forecast peak intensity at onset uncertainty value (same units as peak intensity) (for symmetric uncertainties) (cannot be used with either uncertainty_low or uncertainty_high)	peak-intensity-uncertainty
	uncertainty_low	float	required, if uncertainty_high used	forecast peak intensity at onset lowest uncertainty value (same units as peak intensity) (for asymmetric uncertainties)	peak-intensity-uncertainty-low
	uncertainty_high	float	required, if uncertainty_low used	forecast peak intensity at onset highest uncertainty value (same units as peak intensity) (for asymmetric uncertainties)	peak-intensity-uncertainty-high
	time	datetime*	optional	forecast time that the peak intensity value will be reached	peak-intensity-time
	peak_intensity_esp		optional		
	intensity	float	required, if peak_intensity_esp used	forecast peak intensity value in the vicinity of shock passage (ESP)	peak-intensity-esp
	units	string**	required, if peak_intensity_esp used	forecast peak intensity ESP units	peak-intensity-esp-units
	uncertainty	float	optional	forecast peak intensity ESP uncertainty value (same units as intensity) (for symmetric uncertainties) (cannot be used with either uncertainty_low or uncertainty_high)	peak-intensity-esp-uncertainty
	uncertainty_low	float	required, if uncertainty_high used	forecast peak intensity ESP lowest uncertainty value (same units as intensity) (for asymmetric uncertainties)	peak-intensity-esp-uncertainty-low
	uncertainty_high	float	required, if uncertainty_low used	forecast peak intensity ESP highest uncertainty value (same units as intensity) (for asymmetric uncertainties)	peak-intensity-esp-uncertainty-high
	time	datetime*	optional	forecast time that peak intensity ESP value will be reached	peak-intensity-esp-time
	peak_intensity_max		optional		
	intensity	float	required, if peak_intensity_max used	forecast max peak intensity for the entire prediction window value	peak-intensity-max
	units	string**	required, if peak_intensity_max used	forecast max peak intensity value units	peak-intensity-max-units
	uncertainty	float	optional	forecast max peak intensity uncertainty value (same units as intensity) (for symmetric uncertainties) (cannot be used with either uncertainty_low or uncertainty_high)	peak-intensity-max-uncertainty
	uncertainty_low	float	required, if uncertainty_high used	forecast max peak intensity lowest uncertainty value (same units as intensity) (for asymmetric uncertainties)	peak-intensity-max-uncertainty-low
	uncertainty_high	float	required, if uncertainty_low used	forecast max peak intensity highest uncertainty value (same units as intensity) (for asymmetric uncertainties)	peak-intensity-max-uncertainty-high
	time	datetime*	optional	forecast time that the max peak intensity value will be reached	peak-intensity-max-time
	event_lengths		> 1 allowed, optional	must fall within prediction window	
	start_time	datetime*	required	time that the intensity exceeds threshold_start	event-length-start-time
	end_time	datetime*	optional, unless fluences is used	time that the intensity drops below threshold_end	event-length-end-time
	threshold_start	float	required	threshold used to extract start time	event-length-threshold
	threshold_end	float	optional	threshold used to extract end time, if not provided assume threshold_end=threshold_start	
	threshold_units	string**	required	units of threshold	event-length-threshold-units
	fluences		> 1 allowed, optional	corresponds to event lengths	
	fluence	float	required, if fluence used	forecast fluence value (corresponds to event length)	fluence
	units	string**	required, if fluence used	forecast fluence units	fluence-units
	uncertainty_low	float	required, if uncertainty_high used	forecast fluence's lowest uncertainty value (same units as fluence) (for asymmetric uncertainties)	fluence-uncertainty-low
	uncertainty_high	float	required, if uncertainty_low used	forecast fluence's highest uncertainty value (same units as fluence) (for asymmetric uncertainties)	fluence-uncertainty-high
	fluence_spectra		> 1 allowed, optional	corresponds to event lengths	
	start_time	datetime*	required if fluence_spectra used	time that the intensity exceeds threshold_start	
	end_time	datetime*	required if fluence_spectra used	time that the intensity drops below threshold_end	
	threshold_start	float	required if fluence_spectra used	threshold used to extract start time	
	threshold_end	float	required if fluence_spectra used	threshold used to extract end time	
	threshold_units	string**	required if fluence_spectra used	units of threshold	
	fluence_units	string**	required if fluence_spectra used	units of threshold	
	fluence_spectrum		required if fluence_spectra used, > 1 allowed		
	energy_min	float	required if fluence_spectra used	low edge of energy bin in MeV	
	energy_max	float	required if fluence_spectra used	high edge of energy bin in MeV, -1 represented an unbounded integral channel	
	fluence	float	required if fluence_spectra used	fluence value that corresponds to energy bin (defined by energy_min, energy_max) and calculated between start_time and end_time	
	threshold_crossings		> 1 allowed, optional	multiple threshold_crossings can be provided for the same forecast energy channel	
	crossing_time	datetime*	required, if threshold_crossings used	forecast threshold crossing time	thresh-crossing-times
	uncertainty	float	optional	forecast crossing time uncertainty in hours	thresh-crossing-uncertainties
	threshold	float	required, if threshold_crossings used	the particle intensity exceeds this threshold (e.g. 10 pfu)	crossing-thresholds
	threshold_units	string**	required, if threshold_crossings used	units of threshold	crossing-threshold-units
	probabilities		> 1 allowed, optional	multiple probabilities can be provided for the same forecast energy channel	
	probability_value	float	required, if probabilities used	forecast probability value (range 0 to 1)	probabilities
	uncertainty	float	optional	plus/minus error bar for probability_value (in probability_value units)	prob-uncertainties
	threshold	float	required, if probabilities used	the SEP probability_value forecast is for the particle intensity to exceed this threshold value (e.g. 10 pfu)	prob-thresholds
	threshold_units	string**	required, if probabilities used	units of threshold	prob-threshold-units
	all_clear		optional	if you do not provide an all-clear forecast do not enter this key.	
	all_clear_boolean	boolean	required, if all_clear used	There are three situations for setting all_clear_boolean=false: (1) for >10MeV energy channel, your forecast of peak intensity OR threshold crossing exceeds 10 pfu OR your probability forecast for a threshold of 10 pfu exceeds your custom probability_threshold; (2) for the >100MeV energy channel, your forecast of peak intensity OR threshold crossing exceeds 1 pfu OR your probability forecast for a threshold of 1 pfu exceeds your custom probability_threshold; (3) for your custom (non-integral) energy channel, your forecast peak intensity OR threshold crossing exceeds your custom threshold. Custom cases (3) are being stored but will not be used in the all-clear scoreboard display.	all-clear
	threshold	float	required, if all_clear used	particle intensity threshold value all_clear_boolean refers to. Can be (1) 10 pfu for >10MeV channel (2) 1 pfu for >100MeV channel (3) custom	all-clear-threshold
	threshold_units	string**	required, if all_clear used	units of threshold	all-clear-threshold-units
	probability_threshold	float	optional	probability threshold value all_clear_boolean refers to. Must specify this threshold if setting all_clear_boolean based on probability forecast	all-clear-probability-threshold
	sep_profile	string	optional	Text file with 2 - 4 columns: datetime* string, predicted SEP intensity for this energy channel (float), optional uncertainty (if symmetric) or uncertainty_low (if asymmetric) (float) value, optional uncertainty_high (float) value. Please name the file uniquely. To accomplish this, we suggest including your model name and issue time in the filename. Guideline: ModelShortName.PredictionWindowStartTime.IssueTime.EnergyChannel.txt	sep-profile
	native_id	string	optional	Models that produce ensemble SEP profile forecasts can provide a list of text files	native-id
	status		optional	Specify only if forecast has a native id from your model run	
	current_status	string	required, if status used	give the current status of the model/observations	

		<i>comment</i>	string	optional	give more details regarding the current status of the model/observations
		observations		optional	
		<i>all_clear</i>		optional	use this field for observations helpful for interpreting SEP forecasts/observations. also use the inputs field above to define the observatory and instrument used
		all_clear_boolean	boolean	required, if all_clear used	true or false
		all_clear_type	string	required, if all_clear used	allowed values: cme (more can be added upon request)
		<i>alert</i>		optional	
		alert_type	string	required, if alert used	allowed values: ALERT, OBSERVER ALERT, CANCEL ALERT, SUMMARY
		start_time	datetime*	required, if alert used	start time of the alert, usually this is the observation start time
		end_time	datetime*	optional	optional end time of alert, usually this is the observation end time
		<i>comment</i>	string	optional	give more details regarding the alert

*datetime expected in UTC and in the format(s): "YYYY-MM-DDTHH:MM:SSZ"

**units string format: Example: "MeV^-1*s^-1*cm^-2*sr^-1". Another example: "pfu" where 1 pfu = 1 s^-1*cm^-2*sr^-1

JSON filename guideline: ModelShortName.PredictionWindowStartTime.IssueTime.json